I, Tadahiko Itoh, a Patent Attorney of Tokyo, Japan having my office at 32nd Floor, Yebisu Garden Place Tower, 20-3 Ebisu 4-Chome, Shibuya-Ku, Tokyo 150-6032, Japan do solemnly and sincerely declare that I am the translator of the attached English language translation and certify that the attached English language translation is a correct, true and faithful translation of Japanese Patent Application No. 2002-274706 to the best of my knowledge and belief.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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[TITLE OF INVENTION] IMAGE FORMING APPARATUS, FAULT MONITORING DEVICE, FAULT MONITORING METHOD, AND FAULT MONITORING PROGRAM

[NUMBER OF CLAIMS] 13

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[PROOF] Required

[DOCUMENT] SPECIFICATION

[TITLE OF THE INVENTION]

IMAGE FORMING APPARATUS, FAULT MONITORING DEVICE, FAULT MONITORING METHOD, AND FAULT MONITORING PROGRAM

[WHAT IS CLAIMED IS]

[CLAIM 1]

An image forming apparatus capable of monitoring occurrence of fault related to image forming process; the apparatus comprising:

an acquiring means for acquiring content of the fault when fault occurs;

a notifying destination determining means for determining a notifying destination to be notified of the content of the fault according to the content of the fault; and

a notifying means for notifying the content of the fault to the notifying destination determined by the notifying destination determining means.

[CLAIM 2]

The image forming apparatus of claim 1, further comprising a fault content storing means for storing the content of the fault and the notifying destination to be notified of the content of the fault in correspondence to each other; wherein

the notifying destination determining means selects the notifying destination corresponding to the content of the fault acquired by the acquiring means in the fault content storing

means, and determines the selected notifying destination as the notifying destination to be notified of the content of the fault.

[CLAIM 3]

The image forming apparatus of claim 1 or 2, further comprising a usage information holding means for holding in advance the installed location information indicating the installed location where the image forming apparatus is installed; wherein

the notifying means further notifies the notifying destination of the installed location information held in the usage information holding means.

[CLAIM 4]

The image forming apparatus of claim 3, wherein the installed location information is image information of a map indicating the installed location.

[CLAIM 5]

The image forming apparatus of any one of claims 1 to 4, further comprising a usage information holding means for holding in advance the apparatus identifying information for the notifying destination to identify the image forming apparatus; wherein

the notifying means further notifies the notifying destination of the apparatus identifying information held in the usage information holding means.

[CALIM 6]

The image forming apparatus of any one of claims 1 to 5, further comprising an e-mail creating means for creating an e-mail containing the content to be notified to the notifying destination by the notifying means; wherein

the fault content storing means stores the e-mail address as the notifying destination; and

the notifying means transmits the e-mail created by the e-mail creating means to the e-mail address.

[CLAIM 7]

The image forming apparatus of claim 6, further comprising a Web page creating means for creating a Web page containing the content to be notified to the notifying destination by the notifying means; wherein

the e-mail creating means contains a URL of the Web page created by the Web page creating means in the e-mail.

[CLAIM 8]

The image forming apparatus of claim 6 or 7, wherein the fault content storing means further stores the fault content abstract indicating the summary of the content of the fault in correspondence with the content of the fault; and

the e-mail creating means contains the fault content abstract in a subject of the e-mail.

[CLAIM 9]

The image forming apparatus of any one of claims 1 to 8, wherein the fault content storing means stores a contacting

address of a manager managing the image forming apparatus as the notifying destination, and the content of the fault corresponded to the contacting address of the manager in the fault content storing means is a fault that is difficult for the user using the image forming apparatus to restore.

[CLAIM 10]

The image forming apparatus of any one of claims 1 to 9, wherein the fault content storing means stores a contacting address of a user using the image forming apparatus as the notifying destination, and the content of the fault corresponded to the contacting address of the user in the fault content storing means is a fault that is easily restored by the user.

[CLAIM 11]

A fault monitoring device for monitoring the occurrence of fault related to data processing; the device comprising:

an acquiring means for acquiring content of the fault when fault occurs;

a notifying destination determining means for determining a notifying destination to be notified of the content of the fault according to the content of the fault; and

a notifying means for notifying the content of the fault to the notifying destination determined by the notifying destination determining means.

[CLAIM 12]

A fault monitoring method for monitoring the occurrence

of fault related to image forming process; the method comprising the steps of:

acquiring the content of the fault when fault occurs;

determining a notifying destination to be notified of the content of the fault according to the content of the fault; and

notifying the content of the fault to the notifying destination determined in the notifying destination determining step.

[CLAIM 13]

A fault monitoring program executed by a computer monitoring the occurrence of fault related to image forming process; the program comprising the steps of:

acquiring the content of the fault when fault occurs;

determining a notifying destination to be notified of the content of the fault according to the content of the fault; and

notifying the content of the fault to the notifying destination determined in the notifying destination determining step.

[0001]

[FIELD OF THE INVENTION]

The present invention relates to an image forming apparatus capable of monitoring the fault related to the image forming process, a fault monitoring device, a fault monitoring method, and a fault monitoring program.

[0002]

[DESCRIPTION OF THE PRIOR ART]

As a method of notifying the occurrence of fault and the like to a user in a computer system in which the peripheral devices connected to a network are operated from a computer terminal, a fault responding system that provides a Web page containing the reason of fault and the memory content of where the fault has occurred to the computer terminal connected to the peripheral device by way of the network is known (refer to e.g., patent document 1).

[0003]

In a printer, a facsimile, a copying machine, and a complex machine including such apparatuses, when fault occurs in such apparatus, the occurrence of fault and the content of the fault must be notified to the user of the apparatus to restore at an early stage.

[0004]

[Patent Publication 1]

Japanese Laid-Open Patent Application No. 2001-67247

(Page 4, and Fig. 2).

[0005]

[PROBLEMS TO BE SOLVED BY THE INVENTION]

However, in the above computer system, the user cannot see the Web page unless the user voluntarily requests for the Web page to be displayed, and thus the Web page must be checked at an appropriate timing, which checking work is cumbersome. Further, unless the Web page is checked, the presence and the like of the faults cannot be known. A monitoring method for appropriately notifying the occurrence of fault and the like to the user and the like when fault occurs in a complex machine and the like is thus desired.

[0006]

The present invention, in view of the above, aims to provide an image forming apparatus capable of notifying the occurrence of faults at an appropriate timing and to an appropriate notifying destination when fault occurs, a fault monitoring device, a fault monitoring method, and fault monitoring program.

[0007]

[MEANS FOR SOLVING THE PROBLEMS]

In order to achieve the above aim, the invention according to claim 1 concerns an image forming apparatus capable of monitoring occurrence of fault related to image forming process; the apparatus comprising an acquiring means for acquiring content of the fault when fault occurs; a notifying destination

determining means for determining a notifying destination to be notified of the content of the fault according to the content of the fault; and a notifying means for notifying the content of the fault to the notifying destination determined by the notifying destination determining means

[0008]

According to the invention in claim 1, the acquiring means acquires the content of the fault when fault occurs, and the notifying means notifies the content of the fault to a predetermined notifying destination. That is, when fault occurs, the occurrence of fault and the like is notified to an appropriate notifying destination to be notified of the occurrence of fault and the like. Therefore, the person who has been notified is able to handle the fault as soon as possible after the occurrence of fault. The notifying means is able to notify the appropriate notifying destination according to the content of the fault, and thus the person who has bee notified is able to perform immediate and appropriate action.

[0009]

The invention according to claim 2 concerns the image forming apparatus of claim 1 that further comprises a fault content storing means for storing the content of the fault and the notifying destination to be notified of the content of the fault in correspondence to each other; and wherein the notifying destination determining means selects the notifying destination

corresponding to the content of the fault acquired by the acquiring means in the fault content storing means, and determines the selected notifying destination as the notifying destination to be notified of the content of the fault.

[0010]

According to the invention of claim 2, the fault content storing means stores the content of the fault and the notifying destination information in correspondence to each other, and thus the notifying destination determining means easily determines the notifying destination to be notified of the content of the fault from the corresponding relationship in the fault content storing means. Since the notifying destination according to the content of the fault is set in advance, the occurrence of fault and the like is notified to the appropriate notifying destination to be notified of the content of the fault as soon as possible.

[0011]

The invention according to claim 3 concerns the image forming apparatus of claim 1 or 2 that further comprises a usage information holding means for holding in advance the installed location information indicating the installed location where the image forming apparatus is installed; and wherein the notifying means further notifies the installed location information held in the usage information holding means to the notifying destination.

[0012]

According to the invention of claim 3, the usage information holding means holds in advance the installed location information of where the image forming apparatus is installed, and the notifying means notifies the installed location information along with the occurrence of fault and the like to the notifying destination, and thus the person who has been notified is able to easily know the location where the fault has occurred. Therefore, even if the person who has been notified manages or uses a plurality of image forming apparatuses thereby making it difficult to easily specify the relevant image forming apparatus, the installed location of the image forming apparatus can be easily known, and thus the fault can be immediately handled.

[0013]

The invention according to claim 4 concerns the image forming apparatus of claim 3 wherein the installed location information is image information of a map indicating the installed location.

[0014]

According to the invention of claim 4, the installed location information includes a map indicating the installed location, and thus the person who has received the installed location information is able to visually and easily recognize the installed location.

[0015]

The invention according to claim 5 concerns the image forming apparatus of any one of claims 1 to 4 that further comprises a usage information holding means for holding in advance the apparatus identifying information for the notifying destination to identify the image forming apparatus; where the notifying means further notifies the apparatus identifying information held in the usage information holding means to the notifying destination.

[0016]

The usage information holding means may hold a plurality of apparatus names as a name of the image forming apparatus. For instance, if a first notifying destination and a second notifying destination are stored in the fault content storing means, the usage information holding means holds the apparatus name given to the image forming apparatus by the first notifying destination and the second notifying destination. That is, the usage information holding means may hold "apparatus a001" as a apparatus name given to the image forming apparatus by the first notifying destination, and may hold "apparatus b001" as a apparatus name given to the image forming apparatus by the second notifying destination

[0017]

According to the invention in claim 5, the usage information holding means holds the identifying information of the image forming apparatus, and the notifying means notifies

the identifying information of the image forming apparatus to the notifying destination along with the occurrence of error and the like, and thus the person who has been notified is able to easily specify the image forming apparatus where error has occurred.

[0018]

The invention according to claim 6 concerns the image forming apparatus of any one of claims 1 to 5 that further comprises an e-mail creating means for creating an e-mail containing the content to be notified to the notifying destination by the notifying means; where the fault content storing means stores the e-mail address as the notifying destination; and the notifying means transmits the e-mail created by the e-mail creating means to the e-mail address.

[0019]

According to the invention in claim 6, the notifying means transmits the e-mail to the e-mail address of the notifying destination through the network. Therefore, the person who has been notified is able to know the occurrence of fault and the like without voluntarily accessing the Web page.

[0020]

The invention according to claim 7 concerns the image forming apparatus of claim 6 that further comprises a Web page creating means for creating a Web page containing the content to be notified to the notifying destination by the notifying

means; where the e-mail creating means contains a URL of the Web page created by the Web page creating means in the e-mail.

[0021]

According to the invention in claim 7, the e-mail creating means includes the URL of the Web page in the e-mail, and thus the person who has received the e-mail can easily specify the Web page to be browsed. Therefore, the error content and the like are easily confirmed.

[0022]

The invention according to claim 8 concerns the image forming apparatus of claim 6 or 7 where the fault content storing means further stores the fault content abstract indicating the summary of the content of the fault in correspondence with the content of the fault; and the e-mail creating means contains the fault content abstract in a subject of the e-mail.

[0023]

According to the invention in claim 8, the e-mail creating means includes the fault content abstract in the subject of the e-mail, and thus the person who has received the e-mail is able to recognize the summary of the error from the subject of the e-mail. Thus, the occurrence of error and the like is easily known.

[0024]

The invention according to claim 9 concerns the image forming apparatus of any one of claims 1 to 8 where the fault

content storing means stores a contacting address of a manager managing the image forming apparatus as the notifying destination, and the content of the fault corresponded to the contacting address of the manager in the fault content storing means is a fault that is difficult for the user using the image forming apparatus to restore.

[0025]

The manager is a person who professionally manages the image forming apparatus, and performs maintenance of the image forming apparatus such as handling the fault and the like difficult for the user to restore. Further, the fault difficult for the user to restore is a fault that requires professional knowledge and the like to restore, and includes optical system defect, paper feeding motor defect and the like.

[0026]

According to the invention in claim 9, since the notifying destination to be notified of the fault difficult for the user to restore is set as the manager, when fault that cannot be recovered by the user occurs, the notifying means notifies the occurrence of fault and the like to the manager. The occurrence of fault and the like is notified to the notifying destination according to the content of the fault.

[0027]

The invention according to claim 10 concerns the image forming apparatus of any one of claims 1 to 9 where the fault

content storing means stores a contacting address of a user using the image forming apparatus as the notifying destination, and the content of the fault corresponded to the contacting address of the user in the fault content storing means is a fault that is easily restored by the user.

[0028]

The user is a person that uses characteristic functions of the image forming apparatus. Further, the fault that can be easily restored by the user is a fault that is restored through a relatively simple operation such as button operation, and includes JAM in which the printing position is shifted, paper jam, paper-out condition for printing and the like.

[0029]

According to the invention in claim 10, since the notifying destination to be notified of the fault easily restored by the user is set to the user, when the fault restorable by the user occurs, the notifying means notifies the occurrence of fault and the like to the user. Thus, the occurrence of fault and the like is notified to the notifying destination according to the content of the fault.

[0030]

The invention according to claim 11 concerns a fault monitoring device for monitoring the occurrence of fault related to data processing; the device comprising an acquiring means for acquiring content of the fault when fault occurs; a notifying

destination determining means for determining a notifying destination to be notified of the content of the fault according to the content of the fault; and a notifying means for notifying the content of the fault to the notifying destination determined by the notifying destination determining means.

[0031]

According to the invention in claim 11, when fault occurs, the occurrence of fault and the like is notified to the appropriate notifying destination to be notified of the occurrence of fault. Therefore, the person who has been notified is able to handle the fault as soon as possible after the occurrence of the fault. The notifying means notifies to the appropriate notifying destination according to the content of the fault, and thus the person who has received the notification is able to perform immediate and appropriate action.

[0032]

The invention according to claim 12 concerns a fault monitoring method for monitoring the occurrence of fault related to image forming process; the method comprising the steps of acquiring the content of the fault when fault occurs; determining a notifying destination to be notified of the content of the fault according to the content of the fault; and notifying the content of the fault to the notifying destination determined in the notifying destination determining step.

[0033]

According to the invention in claim 12, when fault occurs, the occurrence of fault and the like is notified to the appropriate notifying destination to be notified of the occurrence of fault. Therefore, the person who has been notified is able to handle the fault as soon as possible after the occurrence of the fault. The notifying means notifies to the appropriate notifying destination according to the content of the fault, and thus the person who has received the notification is able to perform immediate and appropriate action.

[0034]

The invention according to claim 12 concerns a fault monitoring program executed by a computer monitoring the occurrence of fault related to image forming process; the program comprising the steps of acquiring the content of the fault when fault occurs; determining a notifying destination to be notified of the content of the fault according to the content of the fault; and notifying the content of the fault to the notifying destination determined in the notifying destination determining step.

[0035]

According to the invention in claim 13, when fault occurs, the occurrence of fault and the like is notified to the appropriate notifying destination to be notified of the occurrence of fault. Therefore, the person who has been notified is able to handle the fault as soon as possible after the occurrence of the fault.

The notifying means notifies to the appropriate notifying destination according to the content of the fault, and thus the person who has received the notification is able to perform immediate and appropriate action.

[0036]

[MODE FOR CARRYING OUT THE INVENTION]

A suitable embodiment of the image forming apparatus, a fault monitoring device, a fault monitoring method, and a fault monitoring program according to the present invention will now be described in detail with reference to the accompanying drawings. In the present embodiment, a complex machine serving as the image forming apparatus according to the present invention, and serving as a Web server through connection with the network will be explained.

[0037]

Fig. 1 is a view illustrating the entire system schematically showing the fault monitoring system 5 including a complex machine 1 according to the present embodiment. As shown in Fig. 1, the fault monitoring system 5 includes a complex machine 1, and a plurality of terminal devices 2a, 2b, 2c, ···. The complex machine 1 and the plurality of terminal devices 2a, 2b, 2c, ··· transmit and receive information by way of a network 4. Further, in the present embodiment, the terminal device 2a is a terminal used by the user using the complex machine 1, and the terminal device 2b is a terminal used by a manager managing

the complex machine 1. The manager refers to a person who professionally manages the complex machine 1 and is a person who performs maintenance of the complex machine 1 such as handling faults and the like that are difficult for the user to restore. The user refers to a person who uses characteristic functions such as the function of printing and the like of the complex machine 1. That is, the user instructs printing and the like from the terminal 2a to the complex machine 1 to have the complex machine 1 print a desired print. The types of faults will be hereinafter described.

[0038]

Fig. 2 is a functional block diagram showing the functional configuration of the fault monitoring section 10 for performing fault monitoring in the complex machine 1. The fault monitoring section 10 includes a print controlling part 11, a read controlling part 12, and an RTOS (Real Time Operation System) 30 for implementing the above. The RTOS 30 is an OS that emphasizes on executing the processes in real time and is mounted with a function therefor. In addition to the function of print controlling part 11 and the read controlling part 12, in the RTOS 30, a function for performing prediction of the necessary processing time, and a mechanism for terminating processes within a target time even if a plurality of processing requests are simultaneously issued are provided.

[0039]

The fault monitoring section 10 further includes an e-mail creating part 15, a Web page creating part 16, Java®-VM (Virtual Machine) 44 for executing the same, Java® application 40, and Java® servlet 42. The Java®-VM refers to a software for converting the Java® byte code to the native code of the platform installed on the device such as Windows® and MacOS® and executing the same. Specifically, the processes in the e-mail creating part 15 are executed when the Java®-VM44 executes the Java® application 40 while converting to a format (native code) inherent to the platform. Further, the processes in the Web creating part 16 are executed when the Java®-VM (Virtual Machine) 44 implements the Java® servlet.

[0040]

The fault monitoring section 10 further includes an acquiring part 13, a notifying destination determining part 14, a communication part 17 for transmitting and receiving the information with the terminal devices 2a, 2b, ···, by way of the network 4, a fault content database (DB) 20, and a usage information holding part 22. The communicating part 17 configures the notifying means in the present invention.

[0041]

The print controlling part 11 monitors the fault of the printing unit and detects the fault while controlling the processes in the printing unit. The printing unit is a functional configuration for performing the printing process. The

printing unit will be hereinafter described.

[0042]

The read controlling part 12 monitors the fault of the reading unit and detects the fault while controlling the processes in the reading unit. The reading unit is a functional configuration for performing the reading process. The reading unit will be hereinafter described.

[0043]

The acquiring part 13 acquires the content of the fault when fault occurs in the complex machine 1. Specifically, the acquiring part 13 acquires the content of the fault from the print controlling part 11 when the print controlling part 11 detects the faults of the printing unit, and acquires the content of the fault from the read controlling part 12 when the read controlling part 12 detects the faults of the reading unit.

[0044]

The notifying destination determining part 14 determines the notifying destination to notify the occurrence of fault and the like in accordance with the content of the fault that occurred in the complex machine 1, that is, the content of the fault that occurred in the printing unit and the reading unit. The specific processes will be hereinafter explained.

[0045]

Web page creating part 16 creates the HTML document containing the content the communicating part 17 notifies to

the notifying destination as a Web page using the information stored in the fault content DB 20, and the information held in the usage information holding part 22.

[0046]

The e-mail creating part 15 creates the e-mail containing the content the communicating part 17 notifies to the notifying destination as an e-mail using the information stored in the fault content DB 20, and the information held in the usage information holding part 22. Further, the e-mail creating part 15 includes the e-mail address, serving as the notifying destination determined by the notifying destination determining part 14, in the transmitting destination of the created e-mail.

[0047]

The communicating part 17 notifies the content of the fault to the notifying destination determined by the notifying destination determining part 14. Specifically, the communicating part 17 transmits the e-mail to the e-mail address serving as the notifying destination by way of the network. The communicating part 17 transmits the Web page created by the Web page creating part 16 when the Web page is requested from the terminal device 2 of the user or the manager by way of the network 4.

[0048]

Thus, the content of the fault is notified from the controlling part controlling the portion where the fault has

actually occurred, and the fault monitoring section 10 includes the content of the fault in the Web page or the e-mail provided to the notifying destination. The occurrence of fault and the like may be notified by providing the created Web page or the e-mail to the notifying destination. Therefore, the design of the fault monitoring section 10 does not need to be changed even if the controlling part and the like are changed.

[0049]

The fault content DB 20 corresponds and stores the content of the fault and the notifying destination information and the like indicating the notifying destination to be notified of the content of the fault. The fault content DB 20 will now be explained with reference to Fig. 3. Fig. 3 is a view showing the data configuration in the fault content DB 20. The fault content DB 20 includes the fault content field, the notifying destination field, the message field, the fault content abstract field, and restoring method field.

[0050]

The content of the fault acquired from the print controlling part 11 and the read controlling part 12 by the acquiring part 13 are stored in the fault content field.

[0051]

The notifying destination to be notified of the content of the fault is stored in the notifying destination field. In the present embodiment, the e-mail address is stored in the

notifying destination field as the contacting address of the notifying destination. Further, the notifying destination in the present embodiment is the user or the manager of the relevant complex machine 1. In the fault content DB 20, the contacting address of the manager is corresponded with the content of the fault that is difficult for the user to restore. Further, the contacting address of the user is corresponded with the content of the fault that is easy for the user to restore.

[0052]

The fault that is difficult for the user to restore refers to the fault that requires professional knowledge and the like when restoring the fault, and includes for example, optical system defect, paper feeding motor defect and the like. The state in which the fault that is difficult for the user to restore has occurred is called a service call state. Further, the fault that is easy for the user to restore is a fault that can be restored through a relatively simple operation such as button operation, and includes JAM in which the printing position is shifted, paper jam, and paper-out condition for printing and the like.

[0053]

Since the fault content DB 20 stores the content of the fault and the notifying destination to be notified of the content of the fault in correspondence to each other, the notifying destination determining part 14 selects, when acquiring the content of the fault from the acquiring part 13, the notifying

destination corresponded to the relevant fault content in the fault content DB 20, and determines the selected notifying destination as the notifying destination. Thus, the notifying destination is easily determined.

[0054]

For instance, the content of the fault that is easily restored by the user is notified to the user. The content of the fault that is difficult to be restored by the user is notified to the manager and not the user.

[0055]

In other examples, in addition to the fault that can be restored by the user, the state the user cannot use, such as a state in which the other users are using, may be stored in correspondence with the e-mail address of the user.

[0056]

In another example, although the fault content DB 20 stores one notifying destination and one content of the fault in correspondence to each other in the present embodiment, the contacting address of the manager and the user may both be corresponded and stored as the notifying destination for, for example, the JAM. According thereto, both the user and the manager can be notified of occurrence of fault or the like when a JAM, for example, has occurred.

[0057]

A message indicating the occurred fault content to the

notifying destination is stored in the message field. The e-mail creating part 15 includes the message stored in the message field in the e-mail when creating the e-mail. Further, the Web page creating part 16 includes the message stored in the message field in the Web page when creating the Web page. Thus, the message stored in the message field is used in the e-mail creating part 15 and in the Web page creating part 16.

[0058]

The fault content abstract indicating the summary of the content of the fault is stored in the fault content abstract field. The fault content abstract is used when the e-mail creating part 15 creates the e-mail.

[0059]

The information indicating the recovery method for restoring from the corresponding fault is stored in the restoring method field. The information indicating the restoring method is used when the e-mail creating part 15 creates the e-mail and when the Web page creating part 16 creates the Web page.

[0060]

In the fault content DB 20 explained with reference to Fig. 3, only one user and only one manager are stored in the notifying destination field, but if there are many users, the users may be stored in correspondence with the appropriate fault content. If there are many managers, the managers may be stored in correspondence with the appropriate fault content. In this

case, a plurality of notifying destinations may be corresponded to one fault content.

[0061]

Fig. 4 is a view showing the data configuration in the usage information holding part 22. The usage information holding part 22 holds the installed location information, user information related to the user, and the manager information related to the manager in correspondence to the identifying information identifying the complex machine 1. The installed location information is image information of a map showing the installed location.

[0062]

The user information contains name of the user, the e-mail address of the user, the password registered in the complex machine 1, and the apparatus name of the complex machine 1 given by the user. Similarly, the manager information contains name of the manager, the e-mail address of the manager, the password registered in the complex machine 1, and the apparatus name of the complex machine 1 given by the manager. The apparatus name is equivalent to the apparatus identifying information in the present invention.

[0063]

Thus, the usage information holding part 22 holds the installed location information and information related to the user and the manager, and the e-mail creating part 15 and the

Web page creating part 16 creates the e-mail and the Web page, respectively, using the information held in the usage information holding part 22.

[0064]

The information held in the usage information holding part 22 may for example, be acquired from the user and the like by way of the communicating part 17. Further, it may be acquired from the user and the like by way of an input part (not shown) of user interface and the like arranged on the relevant complex machine 1. The installed location information may be acquired as a file by having the reading unit to be hereinafter described read the document on which the installed location is written. It is desirably acquired as a GIF file.

[0065]

The information held in the usage information holding part 22 may be registered when installing the equipment. Further, after installing the equipment, various information may be changed by instructions from the user and the like.

[0066]

For other examples of the information held in the usage information holding part 22, the installed location information includes information indicating the address of the installed location. For other examples, the location installing information may be a URL of a Web page containing the map indicating the installed location.

[0067]

For other examples, the user information may include an abbreviated number for the user to immediately obtain usage permission of the complex machine 1. Similarly, the manager information may further include a password of the manager, and may further include an abbreviated number.

[0068]

The fault monitoring process of the fault monitoring section 10 will now be explained with reference to Fig. 5. when the print controlling part 11 or the read controlling part 12 detect a fault, the acquiring part 13 acquires the content of the fault (step S100). The notifying destination part 14 selects the notifying destination corresponded to the content of the fault received from the acquiring part 13 in the fault content DB 20, and determines the selected notifying destination as the notifying destination for notifying the content of the fault. When the manager is determined as the notifying destination (Yes in step S102), the electronic main address of the manager is determined as the notifying destination (step S104). Further, when the user is determined as the notifying destination (No in step S102), the e-mail address of the user is determined as the notifying destination (step S106).

[0069]

The Web page creating part 16 creates the Web page including the error message and the recovery method and the like

corresponded to the content of the fault acquired by the acquiring part 13 in the fault content DB 20 (step S110).

[0070]

The process of the Web page creating part 16 in step S110 will now be explained in detail with reference to Fig. 6. Fig. 6(A) shows the Web page indicating the occurrence of JAM. The Web page creating part 16 creates the Web page containing the apparatus name (apparatus a0001) 212, the name of the manager 214, an error message 216 of "JAM in the following location. Follow the instructions and remove the paper", and a map button 218. Here, a schematic view of the complex machine 1 showing the location of the error is also included in the error message 216. Further, the map button 218 is linked to the Web page that shows the map. Fig. 7 shows the Web page 230 of the map linked to the map button 218. The user selects the map button 218 to obtain the Web page of the map.

[0071]

The Web page creating part 16 may create the Web pages shown Fig. 6 and Fig. 7 by including the information stored in the fault content DB 20 and the information held in the usage information holding part 22 in an HTML document format defined in advance.

[0072]

Fig. 6(B) shows the Web page, created by the Web page creating part 16, indicating the occurrence of defect in paper

feeding motor. The defect of the paper feeding motor is one example of the fault content, which notifying destination is the manager. When the fault with the notifying destination as the manager occurs, the Web page containing the content intended for the user such as "report to the service center" is created. Thus, the state of the current complex machine 1 can be recognized even if the access is voluntarily made to the Web page when the user has not received notification by e-mail.

[0073]

Returning to Fig. 5, the processes of the fault monitoring section 10 of after the Web page is created will now be explained. When the notifying destination determining part 14 determines the notifying destination of the content of the fault, the e-mail creating part 15 creates an e-mail with the e-mail address, which is the notifying destination determined by the notifying destination determining part 14 as the transmitting destination (step S112).

[0074]

Referring to Fig. 8, the processes for the e-mail creating part 15 to create the e-mail 300 will now be explained in detail. Fig. 8 shows view of the e-mail created by the e-mail creating part 15 in a frame format. The e-mail creating part 15 includes the e-mail address determined by the notifying destination determining part 14 in the transmitting destination 310 of the e-mail. Further, the fault content abstract corresponding to

the content of the fault that is acquired by the acquiring part 13 is included in the subject 320 of the e-mail 310. "XX" 331 is included in the text portion 330 of the e-mail as the name of the user or the manager, which is the notifying destination, the "apparatus a001" 332 as the apparatus name of the complex machine 1 given by the user or the manager, which is the notifying destination, "JAM has occurred" 333 as the message for notifying the fault, "please remove the paper" 334 as the recovery method and http://www*** as the URL of the Web page relating to the fault created by the Web page creating part 16. Further, the installed location information of the complex machine 1 is attached as an attachment file "installed location data" 330.

[0075]

Returning to FIG. 5, the processes of the fault monitoring section 10 after the e-mail is created will now be explained. The communicating part 17 transmits the e-mail created by the e-mail creating part 15 to the notifying destination by way of the network 4 (step S114).

[0076]

The fault monitoring section 10 then transmits the e-mail containing the content of the fault to the notifying destination when fault occurs, and the user or the manager of the notifying destination recognizes the occurrence of the fault through the e-mail when fault occurs. Therefore, the occurrence of fault is known without accessing the Web page.

[0077]

When the user or the manager who has received the e-mail accesses the URL written in the e-mail, that is, when requesting for the Web page (step S116), the communicating part 17 transmits the Web page created by the Web page creating part 16 (step S118). The fault monitoring processes in the fault monitoring section 10 are then completed.

[0078]

The fault monitoring section 10 transmits the Web page containing the information stored in the fault content DB 20 and the information held in the usage information holding part 22 to the notifying destination by way of the communication part 17. Therefore, the communicating part 17 notifies the information indicating at least either the manager or the user to the notifying destination by transmitting the Web page. Through transmission of the Web page, the installed location information, and the apparatus name given by the user or the manager, which is the notifying destination, are further notified to the notifying destination.

[0079]

Thus, the fault monitoring section 10 transmits the e-mail indicating the occurrence of fault to an appropriate notifying destination, when fault occurs, and thus the user or the manager who has received the notification is able to know that fault has occurred in the complex machine 1. Further, since the

recovery method is also written in the Web page, the complex machine can be recovered by following the instructions.

[0080]

The hardware configuration of the complex machine 1 will now be explained with reference to Fig. 9. The complex machine 1 includes, as a hardware configuration, a ROM 52 for storing basic program relating to image processing and fault monitoring program in the fault monitoring section 10, a CPU 51 for controlling each part of the complex machine 1 according to the programs in the ROM 52 and executing the fault monitoring processes and the like, a RAM 53 for storing various data necessary for controlling the complex machine 1, a reading unit 106 for reading the document, a printing unit 117 for copying and printing the received document, a user interface (I/F) 56 to where the user inputs the operation to transmit the information to the user, a communication I/F 57, connected to the internet, for performing communication, and a bus 62 for connecting each component.

[0081]

The fault monitoring program for executing the fault monitoring process of the complex machine 1 described above is recorded and provided on a computer readable recording medium such as CD-ROM, floppy® disk (FD), DVD and the like in an installable format or an executable format file.

[0082]

The fault monitoring program of the present embodiment may be stored on a computer connected to the network such as an internet and configured so as to be provided by being downloaded via the network.

[0083]

The fault monitoring program according to the present embodiment is loaded on a main storage unit by being read and executed from the recording medium in the complex machine 1, and each part explained in the software configuration is produced on the main storage unit.

[0084]

The configuration of the reading unit 106 and the printing unit 117 will now be explained with reference to Fig. 10 and Fig. 11. Fig. 10 shows an example of a configuration of the mechanism part of the complex machine 1 including the reading unit 106 and the printing unit 117.

[0085]

The document placed on a document board 102 in an automatic document feeder (hereinafter referred to as ADF) 101 is fed to a predetermined position on a contact glass 105 by a feeding roller 103 and a feeding belt 104. The reading unit 106 reads the image data of the document on the contact glass 105. The document that has been read is then discharged by the feeding belt 104 and a discharging roller 107. The feeding roller 103, the feeding belt 104 and the discharging roller 107 are driven

by a motor.

[0086]

A recording paper stacked on a first tray 109, a second tray 110, and a third tray 111 are conveyed to a position contacting a photosensitive drum 116 by a longitudinal conveying unit 115. The image data read by the reading unit 106 is written onto the photosensitive drum 116 by a laser from the printing unit 117, and a toner image is formed as it passes the developing unit 118. The recording paper is conveyed by the conveying belt 119 at a constant speed with the rotation of the photosensitive drum 116 while the toner image is being transferred thereon from the photosensitive drum 116. Thereafter, the image is fixed by a fixing unit 120, and is discharged to a finisher 122 of a post-processing device by the paper discharge unit 121.

[0087]

The finisher 122 of the post-processing device guides the recording paper conveyed by the paper discharging unit 121 normally in a direction of the paper discharging roller 132 and in a direction of a staple processing part. By switching the switch plate 124 upward, it is normally discharged to the paper discharging tray 126 side by way of the conveying roller 123. Further, by switching the switch plate 124 downward, it is conveyed to the staple board 128 by way of the conveying rollers 125, 127.

[0088]

The recording papers stacked on the staple board 128 have the paper edges aligned by a paper aligning jogger 129 each time one sheet of paper is discharged, and is then stapled by a stapler 130 with the completion of one set of copy. The group of recording papers stapled with the stapler 130 is accommodated in a stapled paper discharging tray 131 by its own weight.

[0089]

On the other hand, the paper discharging tray 126 is a paper discharging tray that can move forward and backward. The paper discharging tray 126 that can move forward and backward moves forward and backward for each document, or for each copy sorted according to an image memory, and easily sorts the discharged copied papers.

[0090]

When forming an image on both sides of the recording paper, the recording paper fed from the first tray 109, the second tray 110, and the third tray 111 and formed with an image is not guided to the paper discharging tray side but is temporarily stacked in a both-side paper feeding unit 134 by setting the branching nail 133 for switching the path to the upper side.

[0091]

The recording paper stacked in the both-side paper feeding unit 134 is again re-fed from the both-side paper feeding unit 134 to have the toner image formed on the photosensitive drum 116 transferred thereon, and the branching nail 133 for switching

the path is set on the lower side to guide the paper to the paper discharging tray 126. Thus, the both-side paper feeding unit 134 is used when forming the image on both sides of the recording paper.

[0092]

The photosensitive drum 116, the conveying belt 119, the fixing unit 120, the paper discharging unit 121 and the developing unit 118 are driven by a main motor, and the first paper feeding device 112, the second paper feeding device 113, and the third paper feeding device 114 are transfer driven by a paper feeding clutch from the drive of the main motor. The longitudinal conveying unit 115 is transfer driven by an intermediate clutch from the drive of the main motor.

[0093]

The reading unit (scanner) 106 is configured by the contact glass 105 on where the document is placed and an optical scanning system. The optical scanning system is configured by an exposure lamp 135, a first mirror 136, a lens 137, a CCD image sensor 138 and the like. The exposure lamp 135 and the first mirror 136 are fixed on a first carriage (not shown), and the second mirror 139 and the third mirror 140 are fixed on a second carriage (not shown). When reading the document image, the first carriage and the second carriage are mechanically scanned at a relative speed of 2 to 1 so that the optical length is not changed. The optical scanning system is driven by a scanner driving motor

(not shown).

[0094]

The document image is read by the CCD image sensor 138 and converted to an electric signal (analog image signal), and then converted to digital data (image data). The image data is further performed with various types of image processing. The image magnification can be changed by moving the lens 137 and the CCD image sensor 138 in the left and right direction in Fig. 10. That is, the position in the left and right direction of the lens 137 and the CCD image sensor 138 is set according to the specified magnification.

[0095]

The configuration of the printing unit 117 will now be explained. Fig. 11 is an explanatory view explaining the printing unit 117 in Fig. 10. The printing unit 117 is arranged in a box-shaped sealed structure with various optical components and controlling components and the like in a predetermined optical positional relationship.

[0096]

In Fig. 11, an LD unit 141, a cylinder lens 155, a first mirror 153, a polygon motor 150 for rotating the polygon mirror, an imaging lens 142, a BT lens 151, a mirror 143 and the like are arranged in the printing unit 117 as a scanning optical system. Further, at a position irradiated by the laser light in the vicinity of one end of the photosensitive drum 116, a

synchronization detecting sensor 154 is arranged for generating a main scanning synchronization signal from the laser light guided by the mirror 152 guiding the laser light that has passed the imaging lens 142.

[0097]

In the printing unit 117 configured as above, the laser light irradiated by the LD unit 141 is scanned in the horizontal direction with the polygon mirror 152 that high-speed rotates at a predetermined rotating number by the polygon motor 150, and after passing the imaging lens 142, it is returned at the mirror 143 and collected and imaged on the photosensitive drum 116.

[0098]

The laser light is exposure scanned in a direction (main scanning direction) orthogonal to the direction the photosensitive drum 116 is rotated, and performs recording in a line unit of the image signal output from a selector (not shown) of the image processing part. By repeating the main scanning at the rotating speed of the photosensitive drum 116 and a predetermined period corresponding to the recording density, the image (electrostatic latent image) is formed on the surface of the photosensitive drum. As described above, the laser light output from the printing unit 117 is irradiated onto the photosensitive drum 116 of the image forming system.

[0099]

The synchronization detecting sensor 154 for generating the main scanning synchronization signal is arranged at a position irradiated by the laser light in the vicinity of one end of the photosensitive drum 116. Control of the image recording start timing in the main scanning direction and the generation of the control signal for performing input/output of the image signal are performed based on the main scanning synchronization signal.

[0100]

The present invention is explained using the preferred embodiments but various modifications and improvements may be made to such embodiment.

[0101]

For a first modification, although the print controlling part 11 and the read controlling part 12 detect the occurrence of the fault from the printing unit and the reading unit, respectively, in the above-described embodiment, the print controlling part 11 and the read controlling part 12 may further acquire the recovery method for the occurred fault from the printing unit and the reading unit. In this case, the fault content DB 20 may not store the recovery method.

[0102]

For a second modification, although the complex machine 1 monitors the fault in the print part and the read part in the above-described embodiment, it may monitor the fault in other

configurations and the like. For instance, it may monitor the fault and the like in the paper feeding unit.

[0103]

As a third modification, the present invention may be applied to any other fault monitoring apparatus for monitoring faults, in addition to the complex machine 1 for performing fault monitoring in image reproducing and forming process.

[0104]

As a fourth modification, the fault monitoring device may monitor the faults in devices other than the fault monitoring device. In this case, the fault content data indicating the content of the fault is acquired by way of a connection cable such as a network or a USB. The configuration and processes relating to other fault monitoring of the fault monitoring device are the same as the configuration and the processes of the complex machine 1 explained in the embodiment.

[0105]

[ADVANTAGES OF THE INVENTION]

As explained above, according to the invention of claim 1, when fault occurs, the occurrence of fault and the like is notified to an appropriate notifying destination to be notified of the occurrence of fault and the like. Therefore, the person who has been notified is able to handle the fault as soon as possible after the occurrence of fault. The notifying means is able to notify the appropriate notifying destination according

to the content of the fault, and thus has an advantage that the person who has bee notified is able to perform immediate and appropriate action.

[0106]

According to the invention of claim 2, since the notifying destination according to the content of the fault is set in advance, the occurrence of fault and the like is notified to the appropriate notifying destination to be notified of the content of the fault as soon as possible.

[0107]

According to the invention of claim 3, the usage information holding means holds in advance the installed location information of where the image forming apparatus is installed, and the notifying means notifies the installed location information held in the usage information holding means along with the occurrence of fault and the like to the notifying destination, and thus the person who has been notified is able to easily know the location where the fault has occurred. Therefore, even if the person who has been notified manages or uses a plurality of image forming apparatuses thereby making it difficult to easily specify the relevant image forming apparatus, the installed location of the image forming apparatus can be easily known, and thus the fault can be immediately handled.

[0108]

According to the invention of claim 4, the installed

location information includes a map indicating the installed location, and thus the person who has received the installed location information is able to visually and easily recognize the installed location.

[0109]

According to the invention in claim 5, the usage information holding means holds the identifying information of the image forming apparatus, and the notifying means notifies the identifying information of the image forming apparatus to the notifying destination along with the occurrence of error and the like, and thus the person who has been notified is able to easily specify the image forming apparatus where error has occurred.

[0110]

According to the invention in claim 6, the notifying means transmits the e-mail to the e-mail address of the notifying destination through the network. Therefore, the person who has been notified is able to know the occurrence of fault and the like without voluntarily accessing the Web page.

[0111]

According to the invention in claim 7, the person who has received the e-mail can easily specify the Web page to be browsed. Therefore, there is an advantage that the error content and the like are easily confirmed.

[0112]

According to the invention in claim 8, the person who has received the e-mail is able to recognize the summary of the error from the subject of the e-mail. Thus, there is an advantage that the occurrence of error and the like is easily known.

[0113]

According to the invention in claim 9, when fault that cannot be recovered by the user occurs, the notifying means notifies the occurrence of fault and the like to the manager. There is thus an advantage that the occurrence of fault and the like is notified to the notifying destination according to the content of the fault.

[0114]

According to the invention in claim 10, when the fault restorable by the user occurs, the notifying means notifies the occurrence of fault and the like to the user. There is thus an advantage that the occurrence of fault and the like is notified to the notifying destination according to the content of the fault.

[0115]

According to the invention in claim 11, when fault occurs, the occurrence of fault and the like is notified to the appropriate notifying destination to be notified of the occurrence of fault. Therefore, the person who has been notified is able to handle the fault as soon as possible after the occurrence of the fault. The notifying means notifies to the appropriate notifying

destination according to the content of the fault, and thus the person who has received the notification is able to perform immediate and appropriate action.

[0116]

According to the invention in claim 12, when fault occurs, the occurrence of fault and the like is notified to the appropriate notifying destination to be notified of the occurrence of fault. Therefore, the person who has been notified is able to handle the fault as soon as possible after the occurrence of the fault. The notifying means notifies to the appropriate notifying destination according to the content of the fault, and thus the person who has received the notification is able to perform immediate and appropriate action.

[0117]

According to the invention in claim 13, when fault occurs, the occurrence of fault and the like is notified to the appropriate notifying destination to be notified of the occurrence of fault. Therefore, the person who has been notified is able to handle the fault as soon as possible after the occurrence of the fault. The notifying means notifies to the appropriate notifying destination according to the content of the fault, and thus the person who has received the notification is able to perform immediate and appropriate action.

[BRIEF DESCRIPTION OF THE DRAWINGS]

Fig. 1 is a view of the entire system of a fault monitoring

system 5 including a complex machine 1;

Fig. 2 is a functional block diagram showing a function configuration of a fault monitoring section 10 of the complex machine 1;

Fig. 3 is a frame format view showing the data configuration in a fault content DB 20;

Fig. 4 is a frame format view showing the data configuration in a usage information holding part 22;

Fig. 5 is a flow chart showing the fault monitoring process of the fault monitoring section 10;

Fig. 6 is a view showing the Web page created by a Web page creating part 16;

Fig. 7 is a view showing the Web page created by a Web page creating part 16;

Fig. 8 is a view showing an e-mail created by an e-mail creating part 15 in a frame format;

Fig. 9 is a view showing a hardware configuration of the complex machine 1;

Fig. 10 is a view showing an example of a configuration of a mechanism part of the complex machine 1; and

Fig. 11 is a view showing a configuration of a printing unit 117.

[Explanation of Numerical References]

1 complex machine

2a, 2b, 2c terminal device

4	network
5	fault monitoring system
10	fault monitoring section
11	print controlling part
12	read controlling part
13	acquiring part
14	notifying destination determining part
15	e-mail creating part
16	Web page creating part
17	Communicating part
20	fault content database
22	usage information holding part
56	user I/F
57	communication I/F
62	bus
106	reading unit
116	photosensitive drum
117	printing unit
118	developing unit
119	conveying belt
120	fixing unit
121	paper discharging unit
122	finisher
137	lens
138	CCD image sensor

142 imaging lens

143 mirror

150 polygon motor

154 synchronization detecting sensor

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[DOCUMENT] ABSTRACT

[SUMMARY]

[OBJECTIVE]

The present invention aims to provide an image forming apparatus capable of notifying the occurrence of faults and the like at an appropriate timing and to an appropriate notifying destination when fault occurs.

[MEANS TO ACHIEVE THE OBJECTIVE]

An image forming apparatus capable of monitoring occurrence of fault related to image forming process is provided, which apparatus includes an acquiring means for acquiring content of the fault when fault occurs; a notifying destination determining means for determining a notifying destination to be notified of the content of the fault according to the content of the fault; and a notifying means for notifying the content of the fault to the notifying destination determined by the notifying destination determining means.

[SELECTED FIGURE] FIG. 3

FIG.1

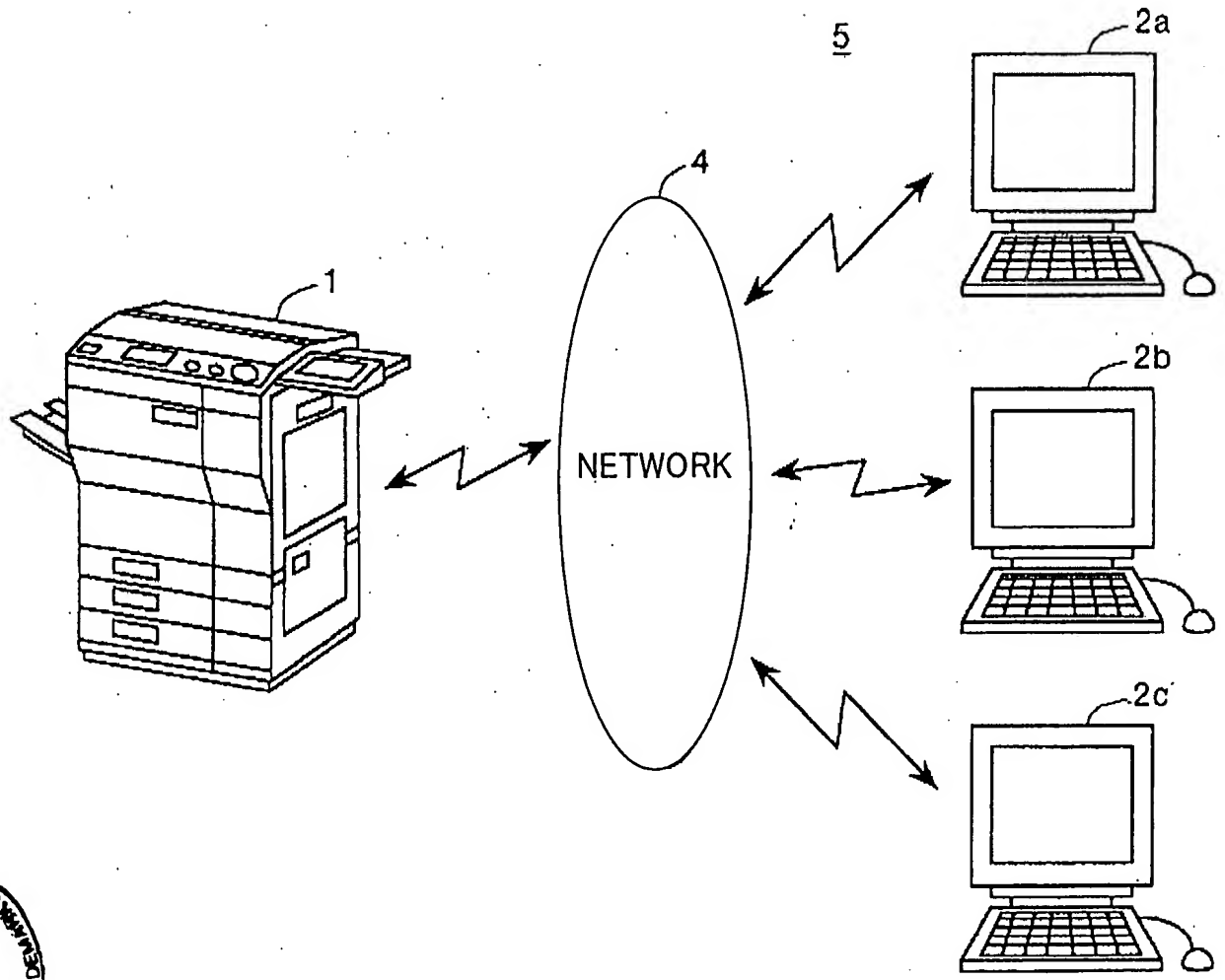

FIG.2

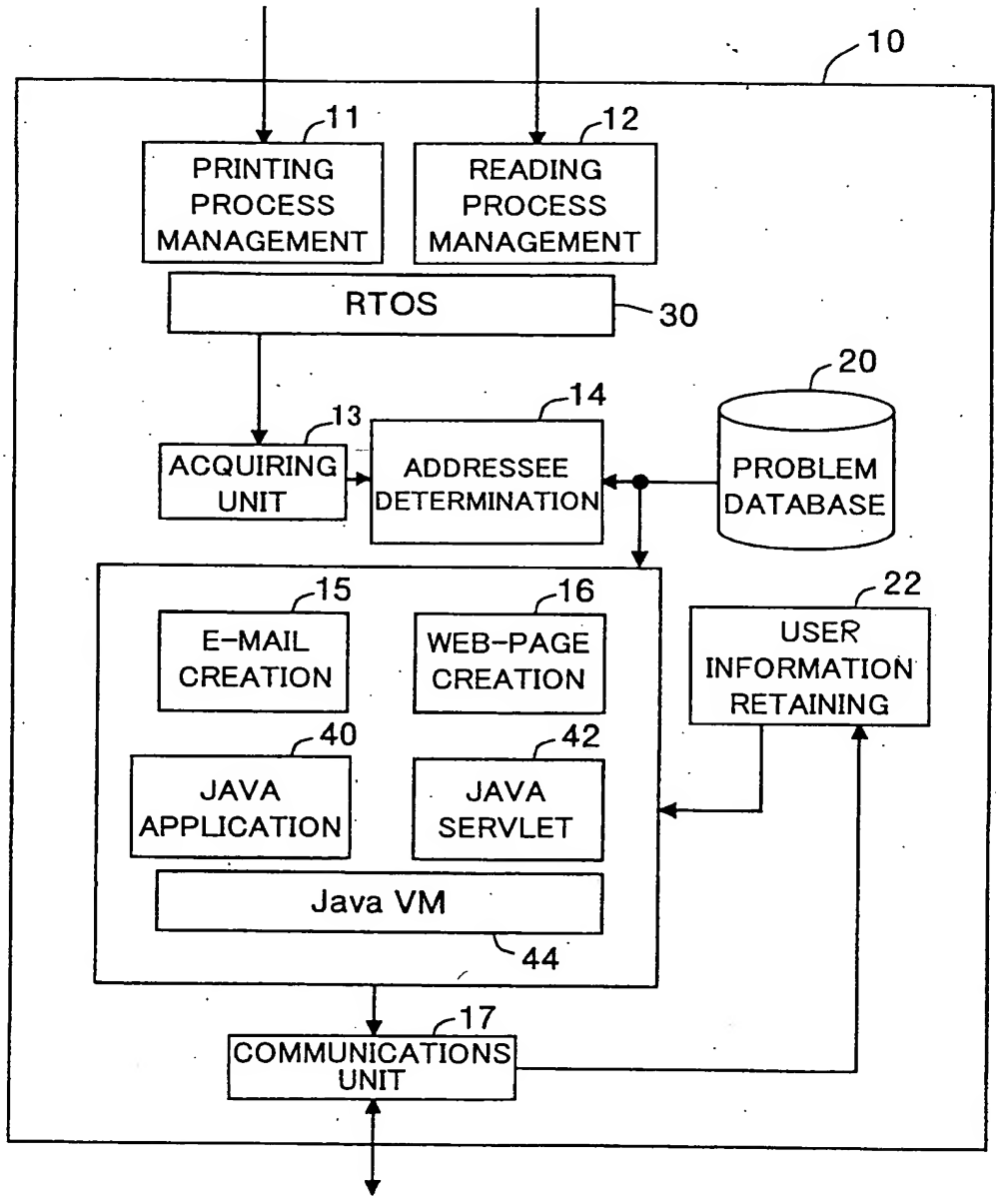
10
11
PRINTING PROCESS MANAGEMENT
12
READING PROCESS MANAGEMENT
RTOS
30
20
13
ACQUIRING UNIT
14
ADDRESSEE DETERMINATION
PROBLEM DATABASE
15
E-MAIL CREATION
16
WEB-PAGE CREATION
22
USER INFORMATION RETAINING
40
JAVA APPLICATION
42
JAVA SERVLET
Java VM
44
17
COMMUNICATIONS UNIT

FIG.3

20a PROBLEM	20b ADDRESSEE	20c MESSAGE	20d PROBLEM ID CODE	20e RESTORATION MEASURES
PAPER TRAY EMPTY	×××@.OO (User's E-mail Address)	There is no paper left in paper supply tray.	ER10	Please supply paper and ···
PAPER JAM		Paper jam has occurred.	ER11	⋮
⋮		⋮	⋮	
PRINT JOB UNEXECUTED	×××@.OOO (User's E-mail Address) ×Δ×@OOO (In-house System Administrator's E-mail Address)	Execution of print job was unsuccessful.	ER21	Please clear the job and ···
⋮		⋮	⋮	⋮
MALFUNCTION IN OPTICAL SYSTEM	ΔΔΔ@.OO (SC Maintenance Person's E-mail Address)	Optical system has problem in ···	SC20	Please power off and ···
MALFUNCTION IN PAPER-FEED MOTOR		Paper-feed motor has problem in ···	SC21	
⋮		⋮	⋮	⋮

FIG.4

MACHINE ID	
LOCATION (MAP DATA)	
USER	NAME
	E-MAIL ADDRESS
	PASSWORD
	APPARATUS NAME
SYSTEM ADMINISTRATOR	NAME
	EMAIL ADDRESS
	PASSWORD
	APPARATUS NAME
SC MAINTENANCE PERSON	NAME
	E-MAIL ADDRESS
	PASSWORD
	APPARATUS NAME
⋮	

FIG.5

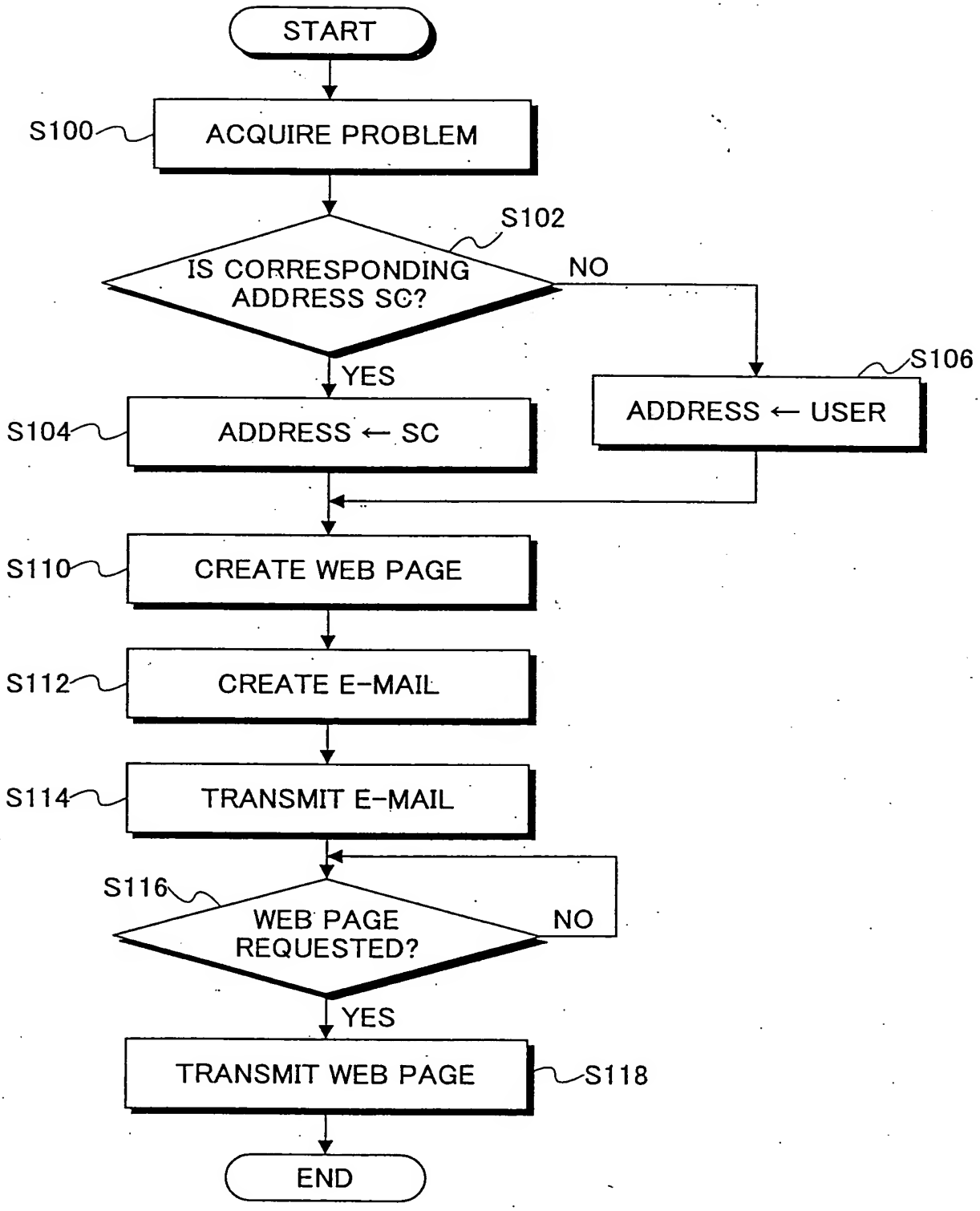
START
S100
ACQUIRE PROBLEM
S102
IS CORRESPONDING ADDRESS SC?
NO
YES
S106
ADDRESS ← USER
S104
ADDRESS ← SC
S110
CREATE WEB PAGE
S112
CREATE E-MAIL
S114
TRANSMIT E-MAIL
S116
WEB PAGE REQUESTED?
NO
YES
TRANSMIT WEB PAGE
S118
END

FIG.6A

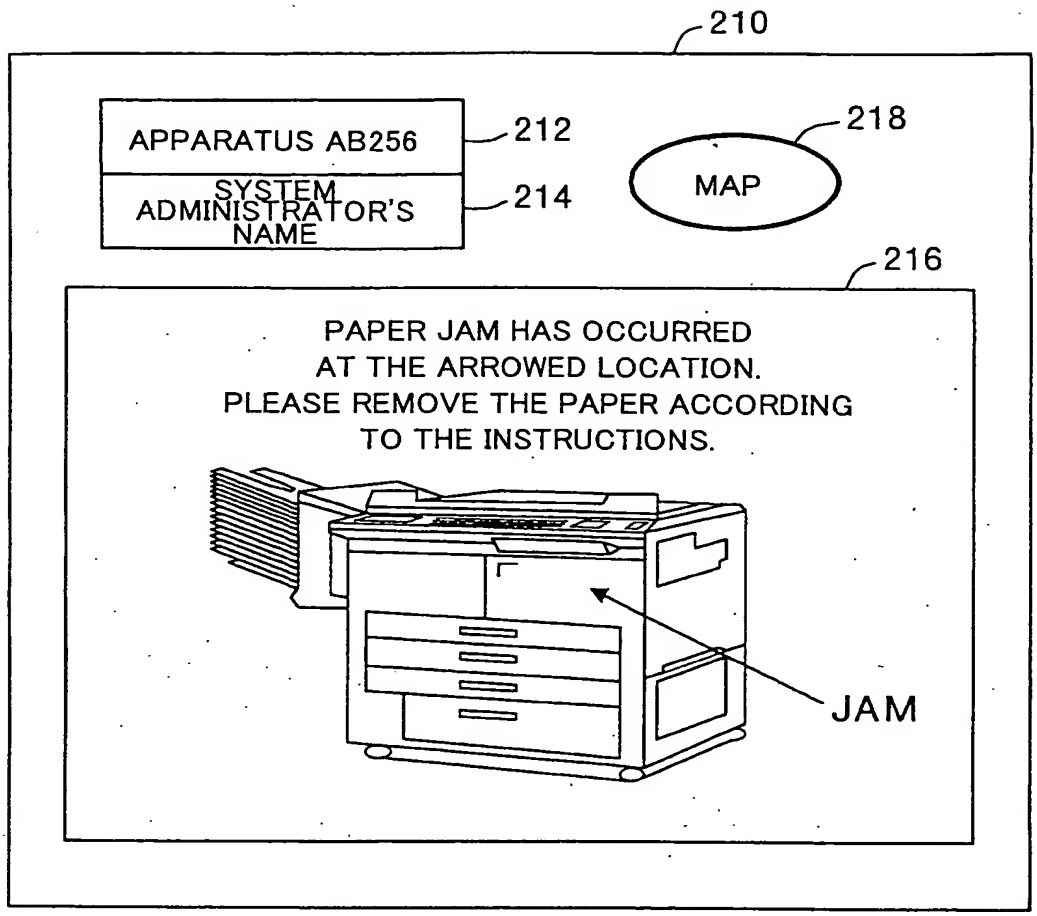
210
APPARATUS AB256
212
SYSTEM ADMINISTRATOR'S NAME
214
MAP
218
216
PAPER JAM HAS OCCURRED
AT THE ARROWED LOCATION.
PLEASE REMOVE THE PAPER ACCORDING
TO THE INSTRUCTIONS.
JAM

FIG.6B

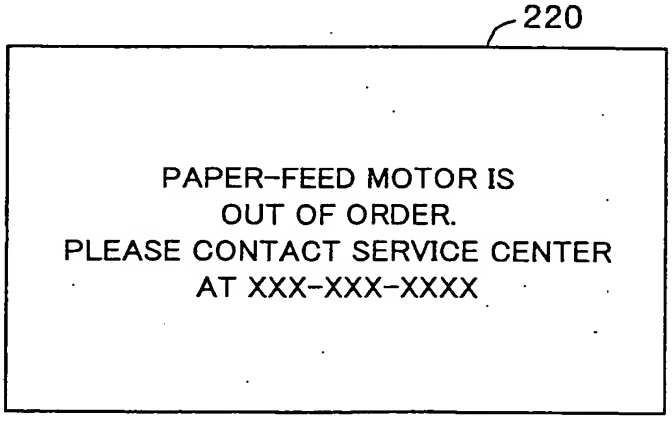
220
PAPER-FEED MOTOR IS
OUT OF ORDER.
PLEASE CONTACT SERVICE CENTER
AT XXX-XXX-XXXX

FIG.7

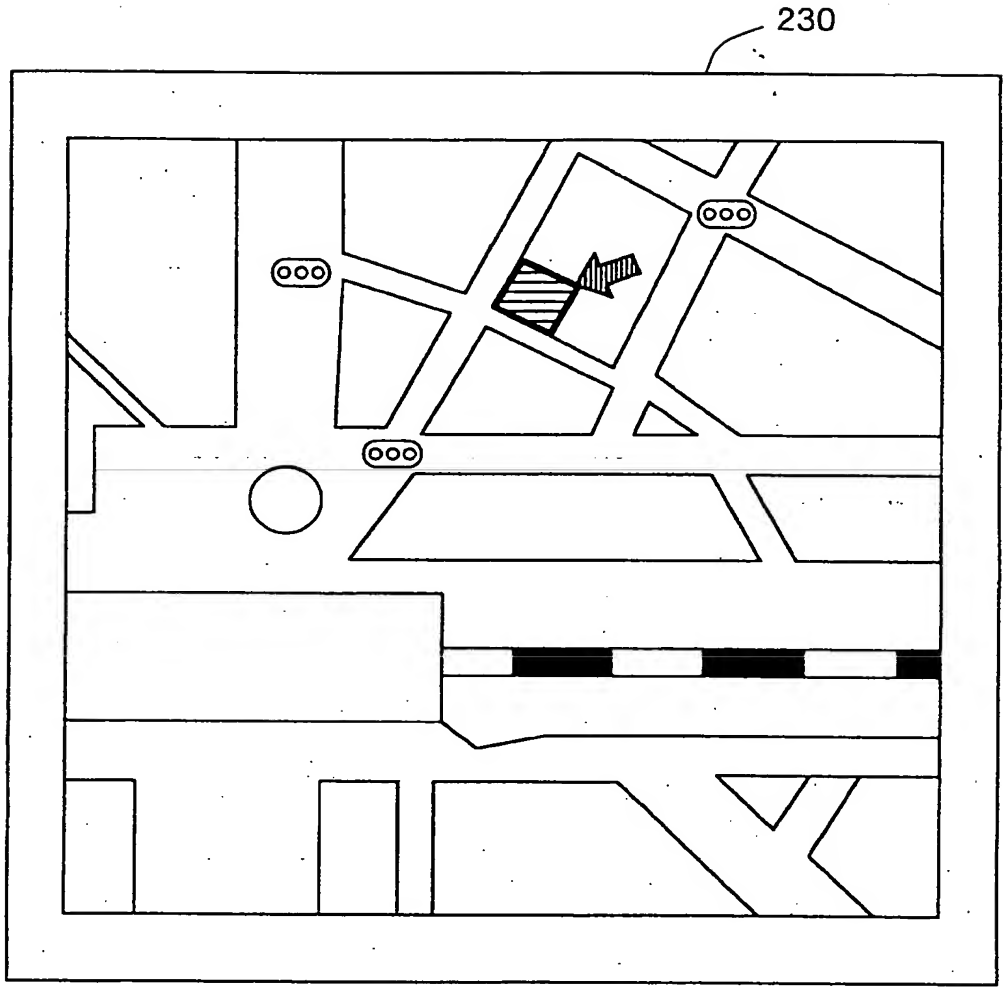

FIG.8

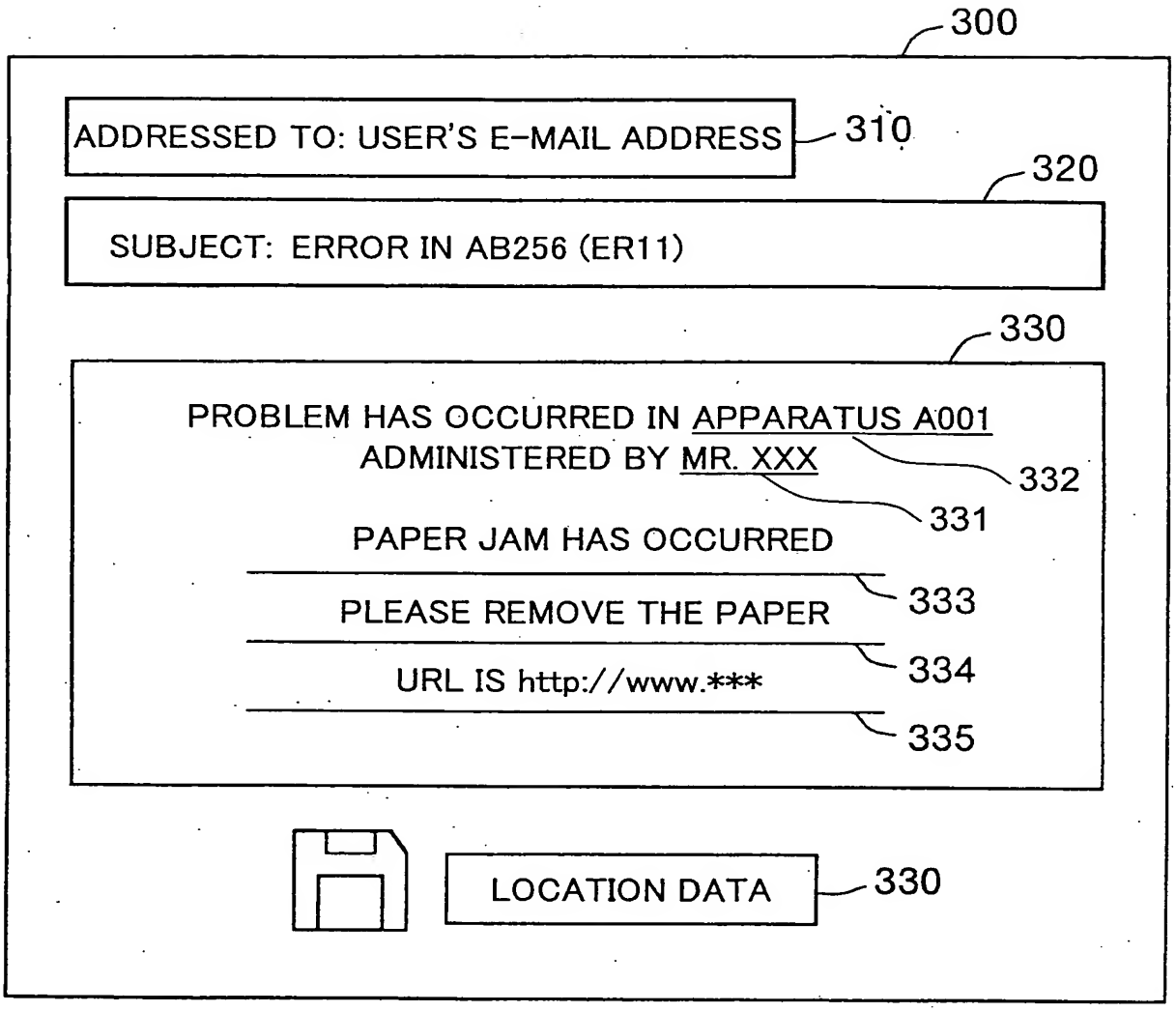
300
ADDRESSED TO: USER'S E-MAIL ADDRESS
310
320
SUBJECT: ERROR IN AB256 (ER11)
330
PROBLEM HAS OCCURRED IN APPARATUS A001
ADMINISTERED BY MR. XXX
332
331
PAPER JAM HAS OCCURRED
333
PLEASE REMOVE THE PAPER
334
URL IS http://www.***
335
LOCATION DATA
330

FIG.9

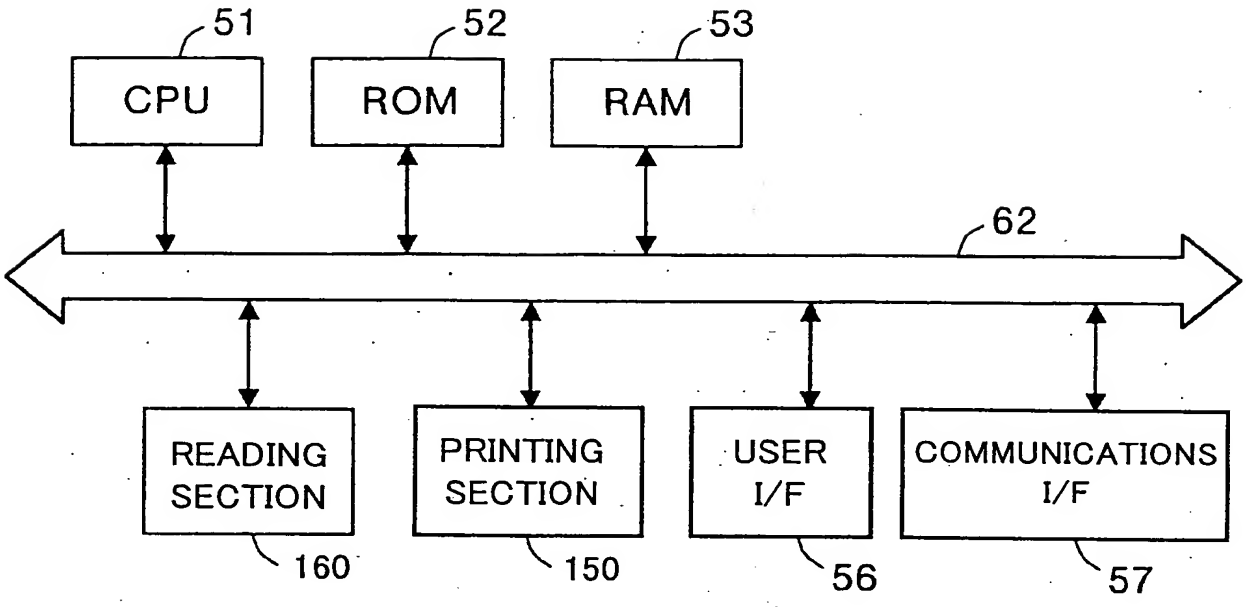
51
52
53
CPU
ROM
RAM
62
READING SECTION
160
PRINTING SECTION
150
USER I/F
56
COMMUNICATIONS I/F
57

FIG.10

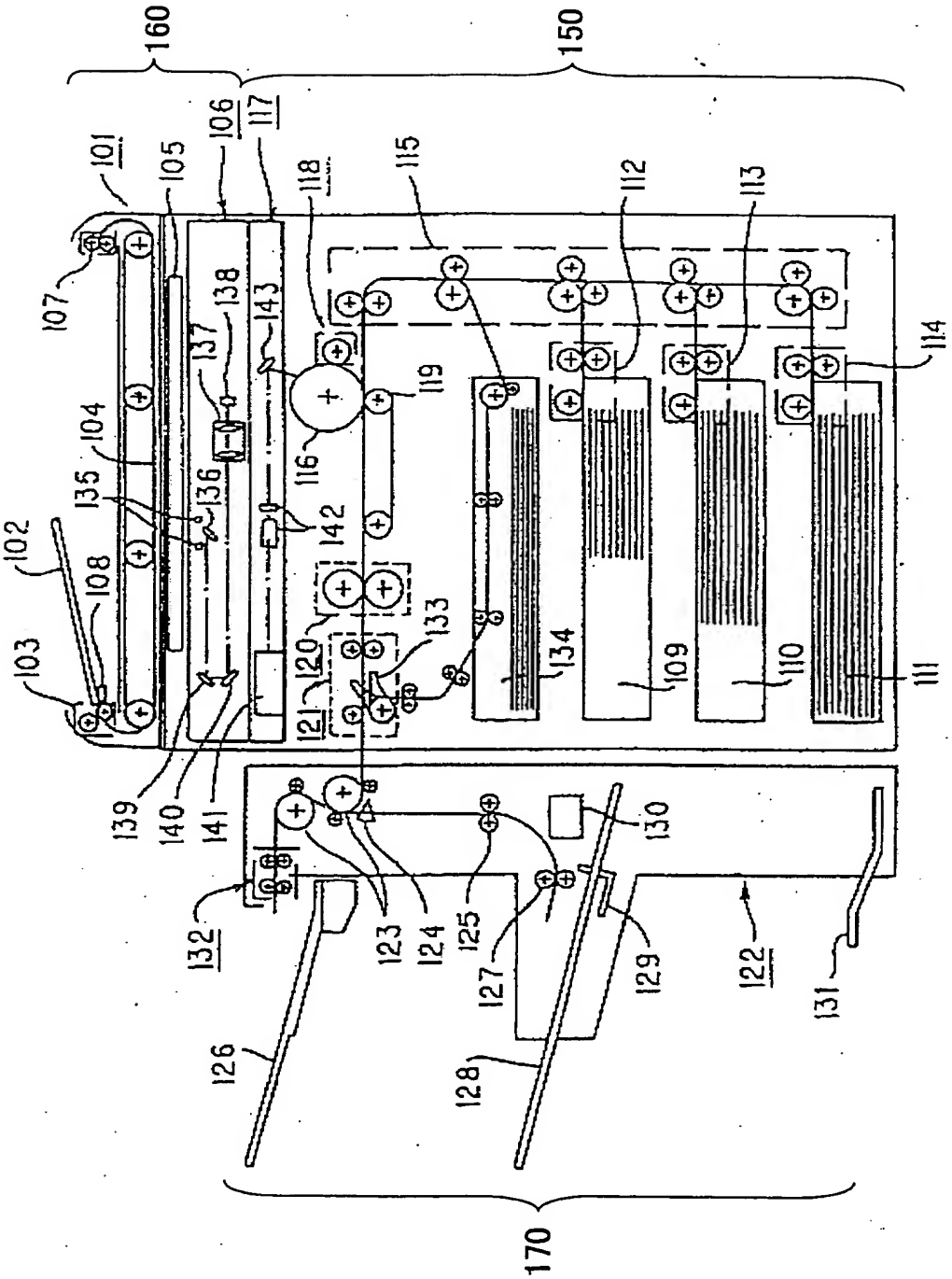
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FIG.11